REMARKS

Claims 1-21 are pending.

Claims 1-21 are rejected.

Claim 1 is amended.

Amended Claim 1

Claim 1 has been amended to insert the word "fermentation" in front of liquor in order to clarify the antecedent basis.

No new matter is added.

Double Patenting

Claims 1-21 are rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 9, and 12-20 of Hughes (US application No. 10/523302).

The Applicants respectfully disagree with the examiner's analysis. Serial no. 10/523302 differs from the presently claimed method in several respects:

Firstly, serial no. '302 claims are directed to the separation of a polysaccharide acid hydrolysis product from a solid residue. See step (iii) of US serial no. '302.

This contrasts with the present method claims which are directed to the separation suspended solids in a fermentation liquor.

Hence, the present claims of serial no. '302 and the present method claims do not overlap. Thus there is no extension of the "right to exclude".

For the above reasons, the applicants believe the request for a terminal disclaimer to be unjustified.

35 USC 103(a)

Claims 1-21 are rejected under 35 USC 103(a) as being unpatentable over Coffey et al., US 2003/0155091 in view of Sun and Cheng, Bioresource Technolgy, 2002, Vol 83, p1-11 and further in view of Verse et all, Us 6,927,048 and further in view of Savage, US 5,552,316.

Coffey relates to high molecular weight water-soluble polymers comprising anionic monomer units, and to their use in papermaking processes. The charged polymers of Coffey wherein the anionic monomer units are present only in an amount of from about 0.1 to 9.9 mol % serve as a flocculant for removing suspended solids from white water in the papermaking processes [see paragraphs 0006, 0010 and 0068].

In contrast, the process of the present invention is directed to separating suspended solids from a fermentation liquor, wherein the fermentation liquor is produced in a fermentation process and wherein this liquor has been subjected to a temperature of at least 50 °C.

In addition, the applicants point out that when using a synthetic polymer of the present process the anionic monomer units are at least 50% by weight. The anionic monomer content of the flocculant of Coffey is about 0.1 to 9.9 mole %. The present synthetic polymer with an anionic monomer content of at least 50 wt. % is far outside the anionic monomer content of the polymer disclosed in US 2003/0155091 (at least a 5 fold difference).

Examiner has combined Coffey with Sun and Cheng to provide the teaching of a fermentation process which allegedly also teaches fermentation in which the liquor has been subjected to a temperature of at least 50 C.

Sun and Cheng (Bioresource Techn. 83 (2002) 1-11) relate to hydrolysis of lignocellulosic materials for ethanol production, wherein removal of lignin and hemicellulose should enhance the hydrolysis rate of cellulose (see abstract), for example by various pretreatments, such as physical, physico-chemical, chemical or biological pretreatments. These pretreatments, which are in fact liquid/solid separation steps, are carried out before the fermentation process of the ethanol production. Only the biological pretreatment under 2.4) refers to a fermentation liquor, but this liquor has not been subjected to a temperature of at least 50 °C. The "low energy requirement" mentioned on page 6, 1st col., line 17 does only mean 37 °C, which is the best temperature, where microorganisms work. The other temperatures mentioned for chemical pretreatments, e.g. under 2.3.5., are not applied on fermentation liquors.

In the present process, as mentioned in the present specification description on page 6, lines 9-11, the fermentation liquor has been subjected to a temperature of at least 50 °C. The process is "particularly suitable for separation processes in which the fermentation liquor has been recovered after the fermentation process has been substantially removed by a distillation step".

Thus it is not obvious to a skilled person to apply the treatment system of Coffey et al. to the fermentation liquor of Sun & Cheng as the Examiner alleges. First of all, the treatment system of Coffey et al. does not use polymeric flocculants formed from at least 50 wt. % anionic monomer units. Secondly, the heat treatment of Sun & Cheng is not applied to a fermentation liquor and the fermentation liquor of Sun & Cheng has not been subjected to a temperature of at least 50 C.

Clearly, key elements are missing from Coffey and Sun & Cheng.

Furthermore, US 6,927,048 B2 (Verser et al.) does not make up for the deficiencies of Coffey and Sun & Cheng. Verser relates to a process of producing ethanol, wherein the fermentation medium yields a biomass byproduct which is useful as animal feed (see col. 4, lines 36-38).

This byproduct is separated from the broth of the first or second fermentation step using a centrifuge, microfilter and nanofilter. There is no suggestion or teaching to employ any assistance of polymers for flocculation (see col. 10, lines 50-52; col. 12, line 58 to col. 13, line 8). Certainly no synthetic polymers are suggested which are formed from at least 50 wt. % anionic monomer units.

US 5,552,316 (Savage et al.) relates to a process for recovering a clarified broth by separating cells and parts thereof from an aqueous fermentation broth using a combination of polymeric cationic and anionic flocculants (claim 1, example 1). The document does not mention any step, wherein the fermentation liquor is subjected to a temperature of at least 50 °C. Heating of fermentation liquors of US 5,552,316 would damage or denature the desired product, therefore heating should be avoided in this case.

Thus the combination of all the references (Coffey, Sun & Cheng, Verser and Savage) fail to arrive at the present claim 1 limitations, making the obviousness rejection improper.

Furthermore particular mention is made in regard to present claim 2.

Claim 2 requires that the fermentation liquor is subjected to a distillation stage in which the fermentation product is recovered, wherein the liquor is removed from the distillation stage as a stillage stream and then subjected to the solids-liquid separation stage.

This is discussed and supported in the present specification on page 6, lines 9-11. The fermentation liquor has been subjected to a temperature of at least 50 C. The process is "particularly suitable for separation processes in which the fermentation liquor has been recovered after the fermentation process has been substantially removed by a distillation step.

Clearly not one of the references mentioned above (Coffey, Sun & Cheng,Verser and Savage) make a suggestion to flocculate with a synthetic polymer from a fermentation liquor which has already had its fermentation product recovered.

Thus claim 2 is clearly unobvious in view of Coffey, Sun & Cheng, Verser and Savage.

Furthermore, Coffey et al. and the other cited documents are concerned with very different fields of art. Coffey is concerned with papermaking not the production of fermentation products. One skilled in the art of fermentation processes would not necessarily look to the papermaking arts to solve a solids-liquid separation problem in a fermentation process.

Reconsideration and withdrawal of the rejection of claims 1-22 is respectfully solicited in light of the remarks and amendments *supra*.

Since there are no other grounds of objection or rejection, passage of this application to issue with claims 1-22 is earnestly solicited.

Applicants submit that the present application is in condition for allowance. In the event that minor amendments will further prosecution, Applicants request that the examiner contact the undersigned representative.

Respectfully submitted,

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